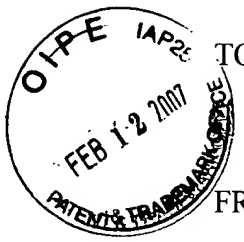
February 5, 2007



TO: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FROM: Stephen B. Ackerman, Reg. No. 37,761
28 Davis Ave.
Poughkeepsie, NY 12603

SUBJECT:

Serial #:	09/495,971
File Date:	02/02/2000
Inventor:	S. Neter
Title:	METHOD AND APPARATUS FOR COLOR COMPENSATION
Art Unit:	2622
Examiner:	Timothy J. Henn

AMENDED APPEAL BRIEF

Dear Sir:

In response to the Final Rejection of Claims 1, 3, 4, 6-10, 12-23, 26, 28-33, 35, 36, 39, and 40 dated July 26, 2006 for the above identified Application for Patent, and to the notification of Non-Compliant Appeal Brief dated Jan. 9, 2007, please accept this amended Appeal Brief.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Arlington, VA 22313-1450 on February 9, 2007.

Signature _____ Date: 2/9/07

Name Stephen B. Ackerman, Reg. #37,761

REAL PARTY IN INTEREST

The real parties in interest are the assignees, Dialog Imaging Systems GmbH; Neue Strasse 95, D-73230 Kircheim-Nabern, Germany. An assignment has been recorded in this case.

RELATED APPEALS AND INTERFERRENCES

There are no known Appeals or Interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal or the subject Application for Patent.

STATUS OF THE CLAIMS

Claims 1, 3, 4, 6-10, 12-23, 26, 28-33, 35, 36, 39, and 40 are pending in the Patent Application and have been rejected. Claims 2, 5, 11, 24, 25, 27, 34, 37, and 38 have been cancelled. This appeal is to the rejection of Claims 1, 3, 4, 6-10, 12-23, 26, 28-33, 35, 36, 39, and 40. The Claims Appendix has a Listing of the Claims in numerical sequence.

STATUS OF THE AMENDMENTS

No amendments have been filed subsequent to the final rejection and there are no amendments pending.

SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 1 describes a color imaging system for compensating a color response. The system is described in the Specification on page 14, lines 4-31 and Figs. 3 and 4 of the Drawings. Fig. 3 shows and array of pixels 130 in a Bayer pattern of red 132, green 134 and 136, and blue 138. The color filter is used to select the colors in the array shown in Fig. 3. Fig. 4 shows a first analog compensation unit 158 coupled to at least one element associated with the first color filter component and a second analog compensation unit 172 coupled to at least one element associated with the second color filter component. Fig. 4 shows an analog summing amplifier 154 coupled to two elements associated with the third color filter component and outputting a sum of the two elements and a third analog compensation unit 166 coupled t the analog sum and adapted to modify a readout of the analog sum. Fig. 4 shows an array controller, column readout control 146 and row readout control 180, adapted to control the readout of the elements associated with the first, second and third color components wherein the array controller directs the readout of the first, second, and third color filter components in a selected

window of the array while other sections of said array are not processed and wherein the array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of the array.

The programmable components respond to a command from and end-user of the imaging system or to a command issued by internal firmware according to firmware stored in the imaging system.

Independent Claim 26 describes a method of compensating a color response in an analog domain of an array of pixel sensor elements. The method includes amplifying an analog output from a plurality of elements of a first color component. This can be performed using the analog red amplifier 156 shown in Fig. 4. The method further includes amplifying an analog output from a plurality of elements of a second color component wherein two said element outputs are summed together prior to said amplifying. This can be performed using the analog summing amplifier 154 and the analog green amplifier 166 shown in Fig. 4.

The method further includes generating a compensated analog readout of the plurality of elements of the first color component wherein only a selected window of said array is processed while other sections of said array are not processed and wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of said array is simultaneously read. This can be performed using the red gain control 160 for the analog

red amplifier 156, the column control readout 146, and the row readout control 180 shown in Fig. 4.

The programmable components respond to a command from and end-user of the imaging system or to a command issued by internal firmware according to firmware stored in the imaging system. The operation of the circuit of Fig. 4 is described on page 14, lines 4-26 of the Specification.

Independent Claim 35 describes a color imager. The imager is described in the Specification on page 14, lines 4-31 and Figs. 3 and 4 of the Drawings. The imager describes a set of sensor elements, shown in Fig. 3 with at least one sensor 132 associated with a first color, at least one sensor associated with a second color 138, and at least two sensors, 134 and 136, associated with a third color. Fig. 3 shows a first amplifier 156 configured to compensate for the first color, a second amplifier 172 configured to compensate for the second color, an analog summing amplifier 154 coupled to the two elements associated with the third color and outputting an analog sum of the two elements, and a third amplifier 166 configured to compensate for the third color.

Claim 35 further describes an array controller, column readout control 146 and row readout control 180, which selectively couples elements associated with the first color to the first amplifier 156, selectively couples elements associated with the second color to the second amplifier 172, and selectively couples elements associated with the third color to the third amplifier, The array controller directs the readout of the first,

second, and third color sensor elements in a selected window of the array while other sections of said array are not processed. The array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of the array.

The programmable components respond to a command from and end-user of the imaging system or to a command issued by internal firmware according to firmware stored in the imaging system.

Independent Claim 39 describes a method of interpolating a color value in the analog domain in real time. Claim 39 describes modifying a first analog signal corresponding to the output of a first pixel element in an imager to color correct the first pixel, the first pixel element used to sense light intensity of a first color. This can be accomplished using a programmable analog amplifier, such as the programmable red amplifier 156, shown in Fig. 4.

Claim 39 further describes modifying a second analog signal corresponding to the output of a second and a third pixel element in the imager to color correct the second and third pixels, wherein the second and third pixel elements are used to sense light intensity of a second color and wherein said second analog signal is a sum of said second and third pixel elements and wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of said array is simultaneously read. This can be accomplished using the analog summing amplifier 154, the analog green amplifier 166, the column readout control 146, and the row readout control 180 shown in Fig. 4.

Dependent Claim 40 describes modifying a third analog signal corresponding to the output of a third pixel element to color correct the third pixel. This can be accomplished using a programmable analog amplifier, such as the programmable blue amplifier 172, shown in Fig. 4.

The programmable components respond to a command from and end-user of the imaging system or to a command issued by internal firmware according to firmware stored in the imaging system. The operation of the circuit of Fig. 4 is described on page 14, lines 4-26 of the Specification.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Rejection of Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654).

The Rejection of Claims 7, 8, 30 and 32 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to Claim 1, and further in view of Boisvert et al. (US 5,329,312).

The Rejection of Claims 9 and 10 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) in view of Boisvert et al. (US 5,329,312) as applied to Claim 7, and further in view of Zhou et al. (IEEE).

The Rejection of Claim 23 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to Claim 1, and further in view of Sano et al. (IEEE).

This Appeal is to these rejections of Claims 1, 3, 4, 6-10, 12-23, 26, 28-33, 35-36, and 39-40. Claims 2, 5, 11, 24, 25, 27, 34, 37, and 38 have been cancelled.

ARGUMENT

Rejection of Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654).

Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 under 35

Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 describe a color imaging system for compensating a color response. Key elements of Claims 1, 3, 4,

6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 are "an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array." Hashimoto describes an image sensing apparatus which has the ability to read adjacent horizontal lines sequentially and simultaneously; column 3, lines 59-65. Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array; column 10, lines 9-21. It is believed that Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 are significantly different from and not obvious from Hashimoto in view of Roberts because Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 describe a color imaging system which simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

The Examiner has argued that "the system of Hashimoto does output a 2x2 block of pixels simultaneously". We respectfully disagree for the following reasons. Hashimoto describes an imaging system which simultaneously reads out two adjacent horizontal lines to form an odd field and two horizontal lines to form an even field. If in forming the odd field lines n and n+1 are simultaneously read lines n+1 and n+2 are simultaneously read to form the even field; Fig. 1 and column 3, line 53 - column 4, line 1. Hashimoto describes streaming data which is to be used to form a high quality frame

image. While the two adjacent lines described by Hashimoto would contain a number of 2x2 blocks of pixels a particular 2x2 block pixels from two adjacent rows and two adjacent columns could not be selected without further signal processing which is not described by Hashimoto. The Examiner has argued, in the response to the arguments presented in the response to the first Office Action, that since Hashimoto describes creating a luminance signal using R, G, and B image signals Hashimoto must read a particular 2x2 block pixels from two adjacent rows and two adjacent columns; as is described in Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40. We respectfully disagree and believe that one can not attribute signal processing methods to Hashimoto that are not described in Hashimoto's invention.

Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array, column 10, lines 9-21. However the scanning of windows or sub-arrays described by Roberts is different from the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array described in Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40. It is believed that Roberts does not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as described in Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40; an obvious extension of Hashimoto.

It is believed that an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array

controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array makes Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 distinct from and not obvious from Hashimoto in view of Roberts.

Rejection of Claims 7, 8, 30, and 32 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to Claim 1, and further in view of Boisvert et al. (US 5,329,312).

Claims 7, 8, 30, and 32

Claims 7, 8, 30, and 32 describe a color imaging system for compensating a color response. Claim 7 adds the limitation to Claim 1 that the analog compensation units are programmable gain amplifiers. Claim 8 adds the limitation to Claim 7 that the analog compensation units are programmable gain amplifiers implemented as a separate stage. Claim 30 adds the limitation to Claim 26 that generating a compensated analog readout depends on a temperature of the system. Claim 32 adds the limitation to Claim 26 that the pixel sensor elements are associated with the colors of red, blue and green and that the array of pixel sensor elements is arranged in a plurality of rows and columns and the act of generating comprises:

generating an independent readout for even-numbered rows;

generating an independent readout for odd-numbered rows;

generating an independent readout for even-numbered columns; and

generating an independent readout for odd-numbered columns, such that at least one element associated with a red filter component is coupled to a first programmable gain amplifier, at least one element associated with a blue filter component is coupled to a second programmable gain amplifier, and at least one element associated with a green filter component is coupled to a third programmable gain amplifier.

Key elements of Claims 7, 8, 30, and 32 are "an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array." Hashimoto describes an image sensing apparatus which has the ability to read adjacent horizontal lines sequentially and simultaneously; column 3, lines 59-65. Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array; column 10, lines 9-21. It is believed that Claims 7, 8, 30, and 32 are significantly different from and not obvious from Hashimoto in view of Roberts because Claims 7, 8, 30, and 32 describe a color imaging system which simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

The Examiner has argued that "the system of Hashimoto does output a 2x2 block of pixels simultaneously". We respectfully disagree for the following reasons. Hashimoto describes an imaging system which simultaneously reads out two adjacent horizontal lines to form an odd field and two horizontal lines to form an even field. If in forming the odd field lines n and n+1 are simultaneously read lines n+1 and n+2 are simultaneously read to form the even field; Fig. 1 and column 3, line 53 - column 4, line 1. Hashimoto describes streaming data which is to be used to form a high quality frame image. While the two adjacent lines described by Hashimoto would contain a number of 2x2 blocks of pixels a particular 2x2 block pixels from two adjacent rows and two adjacent columns could not be selected without further signal processing which is not described by Hashimoto. The Examiner has argued, in the response to the arguments presented in the response to the first Office Action, that since Hashimoto describes creating a luminance signal using R, G, and B image signals Hashimoto must read a particular 2x2 block pixels from two adjacent rows and two adjacent columns; as is described in Claims 7, 8, 30, and 32. We respectfully disagree and believe that one can not attribute signal processing methods to Hashimoto that are not described in Hashimoto's invention.

Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array, column 10, lines 9-21. However the scanning of windows or sub-arrays described by Roberts is different from the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array described in Claims 7, 8,

30, and 32. It is believed that Roberts does not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as described in Claims 7, 8, 30, and 32; an obvious extension of Hashimoto.

As indicated by the Examiner Boisvert et al. describe an improved signal processing system which provides white balancing with minimal dark level differences using separate programmable gain amplifiers for each pixel color which are temperature compensated. It is believed that Boisvert et al. do not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as is described in Claims 7, 8, 30 and 32; an obvious extension of Hashimoto in view of Roberts.

It is believed that an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array makes Claims 7, 8, 30 and 32 distinct from and not obvious from Hashimoto in view of Roberts, and further in view of Boisvert et al.

Rejection of Claims 9 and 10 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) in view of Boisvert et al. (US 5,329,312) as applied to Claim 7, and further in view of Zhou et al. (IEEE).

Claims 9 and 10

Claims 9 and 10 describe a color imaging system for compensating a color response. Claim 9 adds the limitation to Claim 1 that the analog compensation units are programmable gain amplifiers and that the programmable gain amplifiers are contained within a pixel circuitry of the array. Claim 10 adds the limitation to Claim 1 that the analog compensation units are programmable gain amplifiers and that the programmable gain amplifiers are within a plurality of column buffers.

Key elements of Claims 9 and 10 are "an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array." Hashimoto describes an image sensing apparatus which has the ability to read adjacent horizontal lines sequentially and simultaneously; column 3, lines 59-65. Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array; column 10, lines 9-21.

It is believed that Claims 9 and 10 are significantly different from and not obvious from Hashimoto in view of Roberts because Claims 9 and 10 describe a color imaging system which simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

The Examiner has argued that "the system of Hashimoto does output a 2x2 block of pixels simultaneously". We respectfully disagree for the following reasons. Hashimoto describes an imaging system which simultaneously reads out two adjacent horizontal lines to form an odd field and two horizontal lines to form an even field. If in forming the odd field lines n and n+1 are simultaneously read lines n+1 and n+2 are simultaneously read to form the even field; Fig. 1 and column 3, line 53 - column 4, line 1. Hashimoto describes streaming data which is to be used to form a high quality frame image. While the two adjacent lines described by Hashimoto would contain a number of 2x2 blocks of pixels a particular 2x2 block pixels from two adjacent rows and two adjacent columns could not be selected without further signal processing which is not described by Hashimoto. The Examiner has argued, in the response to the arguments presented in the response to the first Office Action, that since Hashimoto describes creating a luminance signal using R, G, and B image signals Hashimoto must read a particular 2x2 block pixels from two adjacent rows and two adjacent columns; as is described in Claims 9 and 10. We respectfully disagree and believe that one can not attribute signal processing methods to Hashimoto that are not described in Hashimoto's invention.

Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array, column 10, lines 9-21. However the scanning of windows or sub-arrays described by Roberts is different from the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array described in Claims 9 and 10. It is believed that Roberts does not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as described in Claims 9 and 10; an obvious extension of Hashimoto.

As indicated by the Examiner Boisvert et al. describe an improved signal processing system which provides white balancing with minimal dark level differences using separate programmable gain amplifiers for each pixel color which are temperature compensated. It is believed that Boisvert et al. do not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as is described in Claims 9 and 10; an obvious extension of Hashimoto in view of Roberts.

As indicated by the Examiner, with reference to Zhou et al., programmable gain amplifiers contained within the pixel circuitry and within a plurality of column buffers is known. It is believed, however, that Zhou et al. do not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as is described in Claims 9 and 10; an obvious extension of Hashimoto in view of Roberts in view of Boisvert et al.

It is believed that an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array makes Claims 9 and 10 distinct from and not obvious from Hashimoto in view of Roberts in view of Boisvert et al., and further in view of Zhou et al.

Rejection of Claim 23 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto (US 4,768,085) in view of Roberts (US 5,541,654) as applied to Claim 1, and further in view of Sano et al. (IEEE).

Claim 23

Claim 23 describes a color imaging system for compensating a color response. Claim 23 adds the limitation to Claim 1 that the system further comprises a micro-lenses layer.

Key elements of Claim 23 are "an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are

not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array." Hashimoto describes an image sensing apparatus which has the ability to read adjacent horizontal lines sequentially and simultaneously; column 3, lines 59-65. Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array; column 10, lines 9-21. It is believed that Claims 9 and 10 are significantly different from and not obvious from Hashimoto in view of Roberts because Claims 9 and 10 describe a color imaging system which simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

The Examiner has argued that "the system of Hashimoto does output a 2x2 block of pixels simultaneously". We respectfully disagree for the following reasons. Hashimoto describes an imaging system which simultaneously reads out two adjacent horizontal lines to form an odd field and two horizontal lines to form an even field. If in forming the odd field lines n and n+1 are simultaneously read lines n+1 and n+2 are simultaneously read to form the even field; Fig. 1 and column 3, line 53 - column 4, line 1. Hashimoto describes streaming data which is to be used to form a high quality frame image. While the two adjacent lines described by Hashimoto would contain a number of 2x2 blocks of pixels a particular 2x2 block pixels from two adjacent rows and two adjacent columns could not be selected without further signal processing which is not described by Hashimoto. The Examiner has argued, in the response to the arguments presented in the response to the first Office Action, that since Hashimoto describes

creating a luminance signal using R, G, and B image signals Hashimoto must read a particular 2x2 block pixels from two adjacent rows and two adjacent columns; as is described in Claim 23. We respectfully disagree and believe that one can not attribute signal processing methods to Hashimoto that are not described in Hashimoto's invention.

Roberts describes an imaging device which includes the ability to scan the pixels in windows of the array, or sub-arrays, more frequently than the pixels in the rest of the array, column 10, lines 9-21. However the scanning of windows or sub-arrays described by Roberts is different from the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array described in Claim 23. It is believed that Roberts does not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as described in Claim 23; an obvious extension of Hashimoto.

As indicated by the Examiner, with reference to Sano et al., the use of a micro-lenses layer is known. It is believed, however, that Sano et al. do not make the simultaneous reading of a particular 2x2 block of two adjacent rows and two adjacent columns from an array; as is described in Claim 23; an obvious extension of Hashimoto in view of Roberts.

It is believed that an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a

selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array makes Claim 23 distinct from and not obvious from Hashimoto in view of Roberts, and further in view of Sano et al.

SUMMARY

It is believed that Claims 1, 3, 4, 6-10, 12-23, 26, 28-33, 35-36, and 39-40 distinguish patentably from the references and should be allowed.

Applicant requests that the Board of Appeals reverse the final rejection of Claims 1, 3, 4, 6, 12-22, 26, 28, 29, 31, 33, 35, 36, 39, and 40 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Roberts.

Applicant further requests that the Board of Appeals reverse the final rejection of Claims 7, 8, 30 and 32 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Roberts as applied to Claim 1, and further in view of Boisvert et al.

Applicant further requests that the Board of Appeals reverse the final rejection of Claims 9 and 10 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Roberts in view of Boisvert et al. as applied to Claim 7, and further in view of Zhou et al.

Applicant further requests that the Board of Appeals reverse the final rejection of Claim 23 under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Roberts as applied to Claim 1, and further in view of Sano et al.

Claims 2, 5, 11, 24, 25, 27, 34, 37, and 38 have been cancelled.

Respectfully submitted,

Stephen B. Ackerman, Reg. No. 37,761

CLAIMS APPENDIX

Listing of Claims:

1. (PREVIOUSLY PRESENTED) A color imaging system for compensating a color response, the system comprising:

an array of pixel sensor elements;

a color filter including a plurality of color filter components organized in a predefined pattern, the color filter overlaying at least a portion of the array, wherein said pixel sensor elements include at least one element associated with a first color filter component, at least one element associated with a second color filter component, and at least one element associated with a third color filter component;

a first analog compensation unit coupled to the at least one element associated with the first color filter component, said first analog compensation unit adapted to modify a readout of the at least one element associated with the first color filter component;

a second analog compensation unit coupled to the at least one element associated with the second color filter component, said second analog compensation unit adapted to modify a readout of the at least one element associated with the second color filter component;

an analog summing amplifier coupled to two elements associated with the third color filter component and outputting an analog sum of said two elements;

a third analog compensation unit coupled to said analog sum, said third analog compensation unit adapted to modify a readout of said analog sum; and

an array controller adapted to control the readout of the elements associated with the first, second and third color components wherein said array controller directs said readout of said first, second, and third color filter components in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

2. (CANCELLED)

3. (ORIGINAL) The system of Claim 1, wherein at least a portion of the array elements arranged in a plurality of rows and columns.

4. (ORIGINAL) The system of Claim 1, wherein the array controller is adapted to control the readout of a plurality of pixel sensor elements in parallel.

5. (CANCELLED)

6. (ORIGINAL) The system of Claim 1, wherein the analog compensation units are gain amplifiers.

7. (ORIGINAL) The system of Claim 1, wherein the analog compensation units are programmable gain amplifiers.

8. (ORIGINAL) The system of Claim 7, wherein the programmable gain amplifiers are implemented as a separate stage.

9. (ORIGINAL) The system of Claim 7, wherein the programmable gain amplifiers are contained within a pixel circuitry of the array.

10. (ORIGINAL) The system of Claim 7, wherein the programmable gain amplifiers are within a plurality of column buffers.

11. (CANCELLED)

12. (ORIGINAL) The system of Claim 1, wherein the color filter components include the colors of red, blue and green.

13. (PREVIOUSLY PRESENTED) The system of Claim 1, wherein the array controller causes an independent readout for a set of even-numbered rows and an independent readout for a set of odd-numbered rows to control color compensation for each color component.

14. (ORIGINAL) The system of Claim 1, wherein the array controller causes an independent readout for even-numbered columns and an independent readout for odd-numbered columns to control color compensation.

15. (ORIGINAL) The system of Claim 1, wherein the array controller causes a plurality of substantially simultaneous, independent readouts for a plurality of rows and some columns.

16. (PREVIOUSLY PRESENTED) The system of Claim 1, wherein the pixel sensor elements form a portion of a charge coupled device.

17. (ORIGINAL) The system of Claim 1, wherein the pixel sensor elements form a portion of a complementary metal oxide semiconductor device.

18. (ORIGINAL) The system of Claim 1, wherein at least a portion of the pixel sensor elements are active.

19. (ORIGINAL) The system of Claim 1, wherein at least a portion of the pixel sensor elements are passive.

20. (ORIGINAL) The system of Claim 1, wherein at least a first pixel sensor element is associated with a different color filter component than a second, neighboring pixel sensor element.

21. (ORIGINAL) The system of Claim 1, wherein the predefined pattern is a Bayer color configuration.

22. (ORIGINAL) The system of Claim 1, wherein the predefined pattern comprises the colors of yellow, cyan and magenta.

23. (ORIGINAL) The system of Claim 1, further comprising a micro-lenses layer.

24. (CANCELLED)

25. (CANCELLED)

26. (PREVIOUSLY PRESENTED) A method of compensating a color response in an analog domain of an array of pixel sensor elements, the method comprising:

amplifying an analog output from a plurality of elements of a first color component;

amplifying an analog output from a plurality of elements of a second color component wherein two said element outputs are summed together prior to said amplifying; and

generating a compensated analog readout of the plurality of elements of the first color component wherein only a selected window of said array is processed while other sections of said array are not processed and wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of said array is simultaneously read.

27. (CANCELLED)

28. (ORIGINAL) The method of Claim 26, wherein the act of generating a compensated analog readout comprises amplifying the analog readout for the plurality of elements of the first color component with a first programmable gain amplifier.

29. (ORIGINAL) The method of Claim 26, further comprising determining an optimum level of color compensation for the analog readout of the plurality of elements of the first color component.

30. (ORIGINAL) The method of Claim 26, wherein generating a compensated analog readout depends on a temperature of the system.

31. (ORIGINAL) The method of Claim 26, wherein the pixel sensor elements are associated with the colors of red, blue and green.

32. (ORIGINAL) The method of Claim 31, wherein the array of pixel sensor elements is arranged in a plurality of rows and columns and the act of generating comprises:

generating an independent readout for even-numbered rows;

generating an independent readout for odd-numbered rows;

generating an independent readout for even-numbered columns; and

generating an independent readout for odd-numbered columns, such that at least one element associated with a red filter component is coupled to a first programmable gain amplifier, at least one element associated with a blue filter component is coupled to

a second programmable gain amplifier, and at least one element associated with a green filter component is coupled to a third programmable gain amplifier.

33. (ORIGINAL) The method of Claim 26, wherein the act of generating comprises generating a plurality of substantially simultaneous, independent readouts for the set of rows and the set of columns.

34. (CANCELLED)

35. (PREVIOUSLY PRESENTED) A color imager comprising:

a set of sensor elements, wherein at least one of said elements is associated with a first color, at least one of said elements is associated with a second color, and at least two of said elements are associated with a third color;

a first amplifier configured to compensate for said first color;

a second amplifier configured to compensate for said second color;

an analog summing amplifier coupled to said two elements associated with said third color and outputting an analog sum of said two elements;

a third amplifier configured to compensate for said third color; and

an array controller which selectively couples elements associated with the first color to the first amplifier, said array controller selectively couples elements associated with the second color to the second amplifier, and said array controller selectively couples elements associated with the first third color to the third amplifier wherein said array controller directs said readout of said first, second, and third color sensor elements

in a selected window of said array while other sections of said array are not processed and wherein said array controller simultaneously reads a 2x2 pixel block from two adjacent columns and two adjacent rows of said array.

36. (ORIGINAL) The color imager of Claim 35, wherein the sensor elements are arranged in rows and columns.

37. (CANCELLED)

38. (CANCELLED)

39. (PREVIOUSLY PRESENTED) A method of interpolating a color value in the analog domain in realtime, comprising:

modifying a first analog signal corresponding to the output of a first pixel element in an imager to color correct the first pixel, the first pixel element used to sense light intensity of a first color; and

modifying a second analog signal corresponding to the output of a second and a third pixel element in the imager to color correct the second and third pixels, wherein the second and third pixel elements are used to sense light intensity of a second color and wherein said second analog signal is a sum of said second and third pixel elements and wherein a 2x2 pixel block from two adjacent columns and two adjacent rows of said array is simultaneously read.

40. (ORIGINAL) The method as defined in Claim 39, further comprising modifying a third analog signal corresponding to the output of a third pixel element in the imager to color correct the third pixel.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.